

REGIONAL COMPETITION - ROUND 2

TOSS-UP

1. ERSC; Multiple Choice: In geological studies, all of the following are TRUE of P waves except that they:

- a) are body waves
- b) travel like sound waves
- c) can pass through liquids
- d) are slower than S waves

ANSWER: D -- ARE SLOWER THAN S WAVES

BONUS

1. ERSC; Multiple Choice: Which of the following terms is used to describe the appearance of a mineral in transmitted light?

- a) diaphaneity (pron: die-ah-fah-na'-ah-tee)
- b) translucence
- c) opaqueness
- d) porosity

ANSWER: A -- DIAPHANEITY

TOSS-UP

2. CHEM; Multiple Choice: Compounds of iodine are NOT used for which of the following?

- a) as a refrigerant
- b) in photographic film
- c) as an essential part of diet
- d) as an antiseptic

ANSWER: A -- AS A REFRIGERANT

BONUS

2. CHEM; Short Answer: How many milligrams are in one metric carat?

ANSWER: 200 MILLIGRAMS

TOSS-UP

3. COMP; Short Answer: What does the acronym LISP stand for?

ANSWER: LIST PROCESSING

BONUS

3. COMP; Short Answer: What is the only data structure in the programming language LISP?

ANSWER: A LIST

TOSS-UP

4. BIOL; Multiple Choice: In cell division, the phase following the metaphase is:

- a) prophase
- b) anaphase
- c) telophase
- d) extophase

ANSWER: B -- ANAPHASE

BONUS

4. BIOL; Short Answer: Name the clear watery liquid that surrounds the brain and spinal cord and fills the four cavities or ventricles of the brain.

ANSWER: CEREBROSPINAL FLUID

TOSS-UP

5. PHYS; Multiple Choice: The average annual dose of NATURAL radiation received by the average American is about:
- a) 3 millirems
 - b) 30 millirems
 - c) 300 millirems
 - d) 3,000 millirems

ANSWER: C -- 300 MILLIREMS

BONUS

5. PHYS; Multiple Choice: In the fission of U-235 (read: U-235) , what is the average number of neutrons produced in the fission reaction?
- a) 1.5
 - b) 2.5
 - c) 3.5
 - d) 4.5

ANSWER: B -- 2.5

TOSS-UP

6. GENR; Multiple Choice: Bees must collect nectar from approximately how many flowers to make 1 pound of honeycomb?
- a) 10 thousand
 - b) 2 million
 - c) 20 million
 - d) 50 million

ANSWER: C -- 20 MILLION

BONUS

6. GENR; Short Answer: What is the name of the largest North American terrestrial rodent, distinguished by its spiny covering?

ANSWER: PORCUPINE

TOSS-UP

7. CHEM; Multiple Choice: Which of the following contain sp^2 (read s-p-2) hybridized carbon atoms?

- a) alkanes
- b) alkenes (pron. al-keens)
- c) alkynes (pron. al-kines)
- d) cycloalkanes

ANSWER: B -- ALKENES

BONUS

7. CHEM; Multiple Choice: Which of the following is NOT appropriate for a description of benzene?

- a) characteristic reactivity of an alkene
- b) volatile liquid
- c) aromatic hydrocarbon
- d) resonance hybridization

ANSWER: A -- CHARACTERISTIC REACTIVITY OF AN ALKENE

TOSS-UP

8. ASTR; Multiple Choice: About how many light years across is the Milky Way?

- a) 1,000
- b) 10,000
- c) 100,000
- d) 1,000,000

ANSWER: C -- 100,000

BONUS

8. ASTR; Short Answer: Which unlucky Apollo lunar landing was canceled after an oxygen tank exploded?

ANSWER: APOLLO 13

TOSS-UP

9. BIOL; Multiple Choice: The order of insects that includes beetles is known as:
- a) Coleoptera (pron: ko-lee-op'-teh-rah)
 - b) Orthoptera (pron: or-tho-op'-teh-rah)
 - c) Hymenoptera (pron: high-meh-nop'-teh-rah)
 - d) Diptera (pron: dip'-teh-rah)

ANSWER: A -- COLEOPTERA

BONUS

9. BIOL; Multiple Choice: Sickle cell anemia and Huntington's chorea are both:
- a) virus-related diseases
 - b) bacteria-related diseases
 - c) genetic disorders
 - d) none of the above

ANSWER: C -- CONGENITAL DISORDERS

TOSS-UP

10. MATH; Multiple Choice; Matrix C is the product of matrix A times matrix B. Which of the following must be TRUE.
- a) The number of rows of A equals the number of rows of B.
 - b) The number of columns of A equals the number of columns of B.
 - c) The number of rows of A equals the number of columns of B.
 - d) The number of columns of A equals the number of rows of B.

ANSWER: D -- THE NUMBER OF COLUMNS OF A EQUALS THE NUMBER OF ROWS OF B

BONUS

10. MATH; Multiple Choice: If the log base x of 81 equals 6, then x is equal to:
- a) 3
 - b) 9
 - c) $\frac{1}{3}$
 - d) the cube root of 9

ANSWER: D -- THE CUBE ROOT OF 9

TOSS-UP

11. PHYS; Multiple Choice: When radiation breaks an electron pair bond in a molecule and each fragment of the molecule gets one of the bond electrons, the molecular fragments that are formed are called:

- a) ions
- b) free radicals
- c) stable molecules
- d) gases

ANSWER: B -- FREE RADICALS

BONUS

11. PHYS; Short Answer: To within one minute, what is the half-life of the neutron?

ANSWER: 11.7 MINUTES (ACCEPT 10.7 TO 12.7 MINUTES)

TOSS-UP

12. CHEM; Multiple Choice: Which of the following is NOT a means of preparing carbon dioxide?

- a) burning coke in the absence of air
- b) combustion of methane
- c) heating certain normal carbonates
- d) reaction of acids and carbonates

ANSWER: A -- BURNING COKE IN THE ABSENCE OF AIR

BONUS

12. CHEM; Multiple Choice: Which of the following are not lipids?

- a) fats and oils
- b) starches
- c) steroids
- d) waxes

ANSWER: B -- STARCHES

TOSS-UP

13. COMP; Short Answer: Give the value of the largest integer that can be written as an 8-bit binary number.

ANSWER: 255

BONUS

13. COMP; Short Answer: In BASIC, one might commonly begin a loop with the statement:

FOR I = 1 TO 5 (read: FOR eye equals one TO five)

What statement would be used to end this loop?

ANSWER: NEXT I (PRON: EYE)

TOSS-UP

14. BIOL; Multiple Choice: In most species of Paramecium there are how many contractile vacuoles (pron: vac'-u-oles)?

- a) one
- b) two
- c) three
- d) four

ANSWER: B -- TWO

BONUS

14. BIOL; Multiple Choice: The major fibrous proteins are:

- a) peptone and edestin (pron: pep-tone and ed-es-tin)
- b) glutelin and leucine (pron: glu-te-lin and leu-cine)
- c) valine and lysine (pron: va-line and ly-sine)
- d) myosin and actin (pron: my-o-sin and ac-tin)

ANSWER: D -- MYOSIN AND ACTIN

TOSS-UP

15. ASTR; Which planet has a moon almost as big as the planet itself?

ANSWER: PLUTO

BONUS

15. ASTR; Short Answer: What device first proved that the Earth rotates on its axis?

ANSWER: FOUCAULT PENDULUM

TOSS-UP

16. PHYS; Multiple Choice: In EXTRA-TERRESTRIAL SPACE, heat is transferred by:

- a) conduction
- b) convection
- c) conduction and convection
- d) radiation

ANSWER: D -- RADIATION

BONUS

16. PHYS; Multiple Choice: The ability of an atom to absorb neutrons is its neutron capture cross section. The unit of measurement for neutron capture cross section is:

- a) the nucleus volume
- b) capture capacity
- c) resonance quotient
- d) barn

ANSWER: D -- BARN

TOSS-UP

17. CHEM; Multiple Choice: Which one of the following is NOT a vitamin?

- a) ascorbic acid
- b) niacin (pron: ni'-eh-sen)
- c) trypsin (pron: trip'-sen)
- d) riboflavin (pron: rye'-bow-fla-vin)

ANSWER: C -- TRYPSIN

BONUS

17. CHEM; Multiple Choice: A Poise (pron: poiz) is the unit of measure of which of the following?

- a) pressure
- b) viscosity
- c) force
- d) mass

ANSWER: B -- VISCOSITY

TOSS-UP

18. ERSC; Multiple Choice: Which one of the following minerals does NOT contain silica tetrahedrons?

- a) quartz
- b) muscovite
- c) halite
- d) orthoclase

ANSWER: C -- HALITE

BONUS

18. ERSC; Multiple Choice: In geological studies, arkose gets its reddish color from which of the following minerals?

- a) orthoclase
- b) calcite
- c) aragonite (pron: uh-rag'-o-nite)
- d) quartz

ANSWER: A -- ORTHOCLASE

TOSS-UP

19. GENR; Multiple Choice: The only species of cat that lives and hunts in groups is:

- a) lion
- b) leopard
- c) jaguar
- d) cougar

ANSWER: A -- LION

BONUS

19. GENR; Short Answer: What is another name for the Paleolithic Age?

ANSWER: THE STONE AGE

TOSS-UP

20. PHYS; Short Answer: A 100-watt light bulb is left on for 10 hours. Electricity is 10 cents per kilowatt-hour. How much did it cost to operate the light bulb?

ANSWER: 10 CENTS

BONUS

20. PHYS; Short Answer: The position of a particle with respect to time is given by the equation: $x = t^3 + 2$ (read: x equals t cubed plus 2) where x is in feet and t is in seconds. What is the acceleration, in feet per second squared, of the particle at a time of 2 seconds?

ANSWER: 12 (FEET PER SECOND SQUARED)

TOSS-UP

21. BIOL; Multiple Choice: Costal cartilage:

- a) attaches the ribs to the sternum
- b) covers the ends of the femur
- c) is found in the pinna of the ear
- d) forms the intervertebral disks of the backbone

ANSWER: A -- ATTACHES THE RIBS TO THE STERNUM

BONUS

21. BIOL; Multiple Choice: From which grandparent or grandparents did you inherit your mitochondria (pron: my-toe-chon'-dria)?

- a) mother's parents
- b) paternal grandfather
- c) grand mothers
- d) maternal grandmother

ANSWER: D -- MATERNAL GRANDMOTHER

TOSS-UP

22. CHEM; Multiple Choice: Which of the following describes the orientation of bonds in an sp^3 (read s-p-3) hybridized atom?

- a) triangular
- b) linear
- c) tetrahedral
- d) planar

ANSWER: C -- TETRAHEDRAL

BONUS

22. CHEM; Multiple Choice: In which of the following is the "octet rule" violated?

- a) carbon dioxide
- b) ammonium ion
- c) sulfate ion
- d) nitrogen dioxide

ANSWER: D -- NITROGEN DIOXIDE

TOSS-UP

23. PHYS; Multiple Choice: A solar cell does NOT respond to red light, but DOES respond to green light. The solar cell will be able to respond to:

- a) microwaves
- b) infra-red light
- c) ultraviolet light
- d) all of the above

ANSWER: C -- ULTRAVIOLET LIGHT

BONUS

23. PHYS; Multiple Choice: What is the theoretical limit of the efficiency of a single-crystal single-junction cell in a photovoltaic system?

- a) 9 percent
- b) 29 percent
- c) 79 percent
- d) 99 percent

ANSWER: B -- 29 PERCENT

TOSS-UP

24. MATH; Short Answer: For which values of X from the set of real numbers does the following inequality hold:

$$8x - 6 < 2x + 6 \quad (\text{read: } 8x \text{ minus } 6 \text{ is less than } 2x \text{ plus } 6)$$

ANSWER: $X < 2$ (read: X less than 2)

BONUS

24. MATH; Short Answer: A woman is 22 years older than her daughter. Nine years ago she was twice as old as her daughter. What are their present ages?

ANSWER: THE WOMAN IS 53 YEARS OLD, THE DAUGHTER IS 31 YEARS OLD.

TOSS-UP

25. BIOL; Multiple Choice: Which of the following is NOT a type of neuron?

- a) sensory
- b) motor
- c) association
- d) stimulatory

ANSWER: D -- STIMULATORY

BONUS

25. BIOL; Multiple Choice: Melatonin (pron: mel-eh-toe'-nin) is produced by the:

- a) skin
- b) pineal gland
- c) liver
- d) pituitary gland

ANSWER: B -- PINEAL GLAND
